

CLAIMS

1. A method for protecting a metal structure from corrosion and/or fouling, said metal structure comprising a metal which has a higher electrochemical potential than zinc, and an exposure surface exposed to an environment conducive to corroding and/or fouling said metal, said exposure surface being at least partially coated with a conductive zinc-containing coating in conductive contact with said metal and in direct contact with said environment, said method comprising the step of applying a direct current through said conductive zinc-containing coating via a resistive circuit in which said metal functions as a cathode.
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2. The method of claim 1, wherein the exposure surface is substantially covered with said conductive zinc-containing coating.
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3. The method of claim 1, wherein said conductive zinc-containing coating is a zinc-rich coating having a zinc loading in excess of 80% by weight based upon solids.
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4. The method of claim 1, wherein said direct current is such that the cathodic current density is between about 1 mA/sq.ft to about 100 mA/sq.ft.
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5. The method of claim 1, wherein said metal is iron or an iron-based alloy.
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6. The method of claim 1, wherein said structure is a ship hull.
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7. The method of claim 1, wherein said structure is a bridge.
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8. The method of claim 1, wherein said structure is a storage tank.
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9. The method of claim 1, wherein said exposure surface is substantially covered with said conductive zinc-containing coating; said conductive zinc-containing coating is a zinc-rich coating having a zinc loading in excess of 80% by weight based upon solids; said direct current is such that the cathodic current density is between about 1 mA/sq.ft to about 100 mA/sq.ft; and said metal is iron or an iron-based alloy.
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30. 10. A system for protecting a metal structure from corrosion and/or fouling, said metal structure comprising a metal which has a higher electrochemical potential than zinc, and an exposure surface exposed to an environment conducive to corroding and/or fouling said metal, said system comprising:

(1) a conductive zinc-containing coating on at least a part of said exposure surface, said conductive zinc-containing coating being in conductive contact with said metal and in direct contact with said environment;

5 (2) a direct current supply having a positive terminal and a negative terminal; and

10 (3) a resistive circuit connecting said positive and negative terminals, said resistive circuit comprising said metal as a cathode and an anode resistively connected thereto, and wherein said resistive circuit is structured so that a direct current will flow through said conductive zinc-containing coating.

11. The system of claim 10, wherein said exposure surface is substantially covered with said conductive zinc-containing coating.

12. The system of claim 10, wherein said conductive zinc-containing coating is a zinc-rich coating having a zinc loading in excess of 80% by weight based upon solids.

13. The system of claim 10, wherein said direct current is such that the cathodic current density is between about 1 mA/sq.ft to about 100 mA/sq.ft.

20 14. The system of claim 10, wherein said metal is iron or an iron-based alloy.

15 15. The system of claim 10, wherein said structure is a ship hull.

16. The system of claim 10, wherein said structure is a bridge.

25 17. The system of claim 10, wherein said structure is a storage tank.

18. The system of claim 10, wherein said exposure surface is substantially covered with said conductive zinc-containing coating; said conductive zinc-containing coating is a zinc-rich coating having a zinc loading in excess of 80% by weight based upon solids; said direct current is such that the cathodic current density is between about 1 mA/sq.ft to about 100 mA/sq.ft; and said metal is iron or an iron-based alloy.